REMARKS

The Applicant's attorney has provided his contact information at the end of this submission and the Applicant respectfully requests that the Examiner contact Applicant's Attorney for a phone conference to help resolve any outstanding issues, if any, to place this case in condition for allowance, since Applicant believes that the application is now in condition for allowance.

Claims 42, 47, 48, 50-52, 68, and 71 are currently pending.

Claims 1-41, 43-46, 49, 53-67 and 69-70 have been cancelled.

More specifically in this Office Action:

Claims 42, 47, 48, 50-52, 68, and 71 were rejected in the current Office Action.

Prior claims 57-59 were rejected under 35 USC 112 and 101 in the current Office Action

By this amendment claims 57-59 have been cancelled without prejudice so that the 35 USC 112 and 101 rejections are moot and are therefore no longer at issue.

Prior claims 42, 47, 48, 50-52, 68, and 71 were rejected under 35 USC §112 First Paragraph in the current Office Action.

By this amendment these claims have been amended to present them in a form the Examiner has previously found acceptable under 35 USC 112 or 35 USC §101 in the March 26, 2008 Office Action, making this rejection no longer an issue. This is discussed in more detail below. Thus, the prior art rejections of claims 42, 47, 48, 50-521, 68 and 71 are the only rejections still at issue.

Prior claims 42, 47, 48,50-52, 68, and 71 were also rejected under 35 USC § 102(b) as being anticipated by or in the alternative under 35 USC §103(a) as being obvious in light of Loeb (US Patent 3,906,250).

Claims 42, 47-48, 50-52, 68, and 71 were rejected under 35 USC § 102(b) or in the alternative under 35 USC § 103(a) as being unpatentable over DE 3121968.

In an attempt to substantially reduce the pending issues, and permit the Applicant to concentrate on rebutting the prior art rejections, in this amendment, claims 57-59 have been cancelled without prejudice. In addition, the remaining claims have been amended such that the claims are now in the same form as the claims were prior to the final office action dated March 26, 2008. In the Final Office Action dated March 26, 2008, none of the claims 42, 47-48, 50-52, 68, and 71 were rejected other than by art and are now considered to be acceptable under 35 USC § 112 or 35 USC §101. Accordingly, the response contained herein specifically addresses in detail the prior art rejections of the claims now pending in this application and includes as added support of patentability declarations under 37 CFR 1.132 by Dr. Grant McGimpsey and the inventor Irving DeVoe. In addition, it should be noted that Dr. McGimpsey prepared a prior declaration under 37 CFR 1.132 that was submitted together with the Response on March 12, 2008 in response to the Office Action dated December 12, 2007. This previous declaration addressed the issue of enablement with respect to the present invention.

It should be further noted that this invention, with system and apparatus claims of substantially the same scope as the present claims and based on the same specification has already been allowed, and will shortly issue, in the following European countries France, England, Germany, and the Netherlands. In addition, this invention with system and apparatus claims of substantially the same scope as the present claims and based on the same specification has also been issued as a patent in China.

Support for the amendments and for the claims can be found in Figures 1, 4, 6, 7, and 9 and the accompanying description and in particular with reference to the valve structures for example valves 22, 28, 310, and 311 and containers 20 and 30 that are closed and are able to have fluid be put into them via the operation of the above said valves. For the Examiner's convenience, a chart outlining the support in the specification for the claims is provided as Exhibit A attached hereto.

Applicant's arguments presented below for allowance of the claims include rebuttals for both the rejections provided in the current Office Action as well as the Office Action dated March 26, 2008 since they are essentially the same rejections in both office actions.

Rejection of claims 42, 47,48, 50-52, 68 and 71 under 35 USC §102(b)/103(a) in view of Loeb (US Patent 3,906,250)

Claims 42, 47-48, 50-52, 68, and 71 have been rejected under 35 USC §102(b)/103(a) as being anticipated by or obvious in light of Loeb (US Patent 3,906,250). A chart is provided to summarize the Applicants rebuttal to each of the Examiner's assertions. This chart is contained in Exhibit B-1 for the Examiner's assertions related to Loeb. A chart in Exhibit B-2 is provided to summarize the Applicants rebuttal to each of the Examiner's assertions related to the DE reference, discussed in more detail below. In addition, the Applicant has provided a claim chart as Exhibit C-1 to aid the Examiner in comparing the elements of claims 42 and 50 to the teachings of Loeb and also, the Applicant has provided a claim chart as Exhibit C-2 to aid the Examiner in comparing the elements of claims 42 and 50 to the teachings of DE.

The Examiner alleges that:

> Loeb teaches (see figures) a method of producing energy from a system having a semipermeable barrier separating a pressure chamber and a solvent chamber, wherein the pressure chamber has a solution (sea water) and solvent chamber has a solvent (river water), the solvent flows from the solvent chamber to the pressure chamber across the membrane, and the solvent chamber has a reduced pressure or vacuum. See also Figure 11, which is a closed system with the solvent chamber having only inflow, wherein the solvent chamber is at zero pressure. The solute solution is evaporated with external heat (like solar) in a third chamber—see figure 6 for example—and the solute is recycled as a concentrated solution. With respect to the limitation, utilizing the semi-permeable barrier to restrict solute from flowing into the first chamber while allowing the solvent to flow into the second chamber as the solvent flows from the first chamber into the second chamber a void is created in the first chamber such that a vacuum develops in the first chamber and increases the pressure in the diluted solute solution in the second chamber; the creation of the void and the increase in pressure in the diluted solution in the second chamber are inherent in the process of natural osmosis and are not patentable process steps. ... With respect to claim 50, a displacement of an object such as a piston, is implied in the reference to a piston in column 11, lines 37-59. The solvent chamber is pressurized by pumps.
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> See pages 9-10 of the Office Action dated July 2, 2008

It is well established in the patent law that "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2

USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP 2131. Such is clearly not the case in the present claimed invention for the reasons stated below and as seen in the claim chart.

The Applicant disputes the Examiner's assertions that the claimed invention is merely replacing an automated process with a manual process, or vice versa. As discussed above, the Applicant has amended the claims to a previous version and in that version, the claimed invention does not call for the opening and closing of the chambers but rather for filling the chambers with solute and solvent solutions. Thus, the Examiner's assertions are moot with respect to the currently claimed invention.

In Loeb, certain definitional issues exist in which terms that are used in Loeb and terms that are used in the claimed invention may appear to be confusing or contradictory to one another. For example, in Loeb the term "high pressure chamber" is not a pressure chamber as used in the claimed invention. Rather, the "high pressure chamber" in Loeb is the side of the system that has the high osmotic pressure fluid pumped into it by a pump 122, see Loeb, Figure 9 and col. 12, lines 12-30. The solute in the "high pressure chamber" is therefore at a higher hydrostatic pressure than normal atmospheric liquid.

Moreover, Loeb, in column 4 lines 25-27 identifies the various pressures of liquid represented in the Figures. In particular, the "P" in the Figures is identified as hydraulic pressure and π is identified as the osmotic pressure of the fluids in the system. Thus, the hydraulic pressure, P, of the fluid may be zero atm, i.e., there is no hydraulic pressure being exerted on the body of fluid. Contrary to the Examiner's assertion, zero atm hydraulic pressure does not imply a vacuum in the claimed invention. Rather I nLoeb, zero atm means that the fluid is not under any hydraulic pressure, i.e., the fluid is not being pumped. As is well known in the art, atm is a unit of pressure, i.e., atmospheres, and is not indicative of the atmospheric pressure on the solution, i.e., that zero atm would not be equal to a vacuum.

Accordingly, when Loeb is discussing pressure, Loeb is referring to the hydraulic pressure of the fluids in the system and uses atmospheres as the units and zero atmospheres is indicative of unpressurized fluid and not a vacuum that is created by the device as in the claimed invention. Thus, the Applicant's assertion that Loeb fails to teach a vacuum as produced and used in the claimed invention is supported by the specification and figures of Loeb.

In Loeb, the addition of mechanical energy to the system is provided by adding more water volume to the system, thereby increasing its energy, and not by increasing pressure as in the claimed invention. In Loeb, the sea water (solute) is maintained at a constant and elevated hydrostatic pressure P by pump 122. Additional mechanical energy is then provided to the solute liquid by the inclusion of additional volume to the constant pressure and the extra energy is given by $W=P\Delta V$, where P is the hydrostatic pressure provided by pump 122 and ΔV is the additional solvent volume added to the solute via the river water passing through the semipermeable membrane. See Loeb, col. 12, lines 40-45. Thus, Loeb adds additional fluid volume (solvent) to the solute fluid in the system to add additional energy to the solute fluid, albeit by diluting the solute. Thus, as the solute flows through the system, solvent is added thereto and the increased volume, i.e., the increased mass of water, flows at substantially the same rate, thereby having an increase in energy. More specifically, and in rebuttal to the Examiner's rejection of the claims, Loeb teaches in column 4, lines 35-44 that: "[t]he volume under a pressure P, will increase on the sea water side 6 (Fig. 2b). ... the energy furnished will exceed the energy (work) originally done on the sea water by a fraction $\Delta V/V$ where ΔV is the volume of permeant (solvent) which has passed through the membrane and V is the original volume of sea water. The excess mechanical energy is given by $P\ \Delta V$."

Thus in Loeb, it is the extra volume of solvent added to the solute solution that provides the energy in Loeb and the hydraulic pressure P remains substantially constant. As figures 2a and 2b in Loeb show the hydraulic pressure added, $P<\pi$, allows the solvent, fresh water, to flow into the second chamber, 6, increasing the volume from V m^3 to $(V+\Delta V)$ m^3.

The Examiner has also asserted that Loeb teaches a vacuum is produced in the Loeb system. This is incorrect, In Loeb, the V-P diagrams shown in Figures 3a and 4a indicate that there is no vacuum produced by the device taught in Loeb. The pressure depicted in the graph is hydraulic pressure and thus, zero pressure is not a vacuum but unpressurized fluid. As Loeb states in col. 5, lines 19-44:

> As one example, 1 cubic meter of sea water (as a basis) at zero atmospheres hydraulic pressure and 25 atmospheres osmotic pressure (Point A in Figs 3 and 3a) is compressed by pump 16 to 10 atmospheres hydraulic pressure (Point B) thus absorbing mechanical energy equal to (1)(10) = 10 cubic meter-atmospheres (m^3 atm) or 0.28 kilowatt hours (KWH) (Area ABEF in FIG 3a).

> ... The sea water is then passed through pathway 14 of the PRO apparatus 10 at the hydraulic pressure of 10 atmospheres in counterflow to the river water at zero hydraulic pressure flowing through pathway 18 on the other side of membranes 12. The sea water absorbs 0.6 m^3 of permeant through the membranes. Thus 1.6 m^3 of diluted brine leave the PRO apparatus at a hydraulic pressure of 10 atmospheres (Point C).
>
> As the sea water passes through hydroturbine generator 17, its hydraulic pressure is released to zero (Point D) in the process of delivering (1.6)(10) = 16 m^3atm or .45 KWH of energy (Area CDEF in FIG 3a).

Although the solvent will flow across the semipermeable barrier, there is no teaching in Loeb of a vacuum or reduced pressure in any of the various embodiments of the PRO engine disclosed within Loeb.. See Loeb, the entire document. It is important to note that the figures in Loeb are described as being block diagrams, see Loeb col. 3, lines 10-63 and cannot therefore be thought of as physically representative of the system. A block diagram cannot be relied upon to show a closed system or an open system. Given that there is no mention of a vacuum or reduced or lower pressure in the low hydraulic pressure side of the PRO engine, it is not logical to assume that any vacuum is produced, or even , that the pressure is lowered. In addition, the lower hydraulic pressure side of the PRO engine is to be maintained as a low hydraulic pressure side, and if river water is continuously pumped into this side (by a pump), see Loeb, col. 12, lines 30-35, as is taught the side cannot be closed as the hydraulic pressure would increase due to the closed nature of the system. Thus it is not logical to assume that a vacuum or reduced pressure is provided for in Loeb. The Applicant would request that the Examiner provide specific language and examples of vacuum or reduced pressure being provided for in the solvent side of the PRO engine in the Loeb reference.

The Examiner further asserts that figure 11 of Loeb teaches a closed system with the solvent chamber having only inflow, wherein the solvent chamber is at zero pressure. Although the Examiner references FIG. 11, it is actually the description of FIG. 9 that is relevant. In particular, Loeb in column 12, lines 15-20, states: "FIG. 9 illustrates the PRO section 102 (of FIG 8) of the heat engine; FIGS 10-14 (described below) illustrate different arrangements which may be used for the thermal unmixing section 104 (of FIG 8)." Thus, the descriptions at issue are those for FIGS 8 and 9 and not FIG. 11.

However, as pointed out above, Figures 8, 9, and 11 of Loeb is only a block diagram and not a physical representation of the system and there is no teaching of a closed system anywhere in Loeb. The solvent, river water, is provided into the PRO engine, thus Loeb teaches: "Simultaneously a diluted solution, by which is meant one having a low osmotic pressure, (π_{low}), and having a volume of .ΔV m^3 is pumped (by a pump not shown) via line 128 into the low hydraulic pressure side of the membrane unit 124. The diluted solution permeates through the membranes against the hydraulic pressure P because it is arranged that everywhere in the unit P>ΔP where ΔP is the osmotic pressure difference (atm) between the solutions on each side of the membrane. This is the fundamental principle of pressure-retarded osmosis, as described above." See Loeb, col. 12, lines 30-41.. Thus, there is no teaching of a closed system in Loeb.

In addition, Loeb fails to teach the creation of a vacuum or reduced pressure in the solvent container, which as pointed out above is not taught to be a closes system. Only a closed container that did not have fluid flowing into it to replace any fluid flowing out of the container could generate a vacuum or reduced pressure inside. As pointed out above, there is no teaching in Loeb that the solvent container is closed and therefore it cannot have a vacuum created therein as in the claimed invention. The Applicant would request that the Examiner provide specific language and elements in the drawings that a closed system in Loeb.

The Fig 9 description begins on column 12, line15 and "[i]llustrates the PRO section 102 (of FIG 8) of the heat engine; FIGS 10-14 (described below) illustrate different arrangements which may be sued for the thermal unmixing section 104 (of FIG 8).

In particular, Loeb teaches:

> A concentrated solution, by which is meant one having a high osmotic pressure (π_{high}), and having a volume of V cubic meters (m^3) is pressurized by pump 122 to a hydraulic pressure P atmospheres (atm) requiring a work input of PV cubic meter atmospheres (m^3 atm), after which it is pumped via line 127 into the high pressure side of the membrane unit 124. Simultaneously a diluted solution, by which is meant one having a low osmotic pressure, (π_{low}), and having a volume of ΔV m^3 is pumped (by a pump not shown) via line 128 into the low hydraulic pressure side of the membrane unit 124. The diluted solution permeates through the membranes against the hydraulic pressure P because it is arranged that everywhere in the unit P> ΔP where ΔP is the osmotic pressure difference (atm) between the solutions on each

> side of the membrane. This is the fundamental principle of pressure-retarded osmosis, as described above.
>
> A volume $(V + \Delta V)$ m^3 of mixed solution is sent to hydroturbine 126 at the pressure P atm. Thus the hydroturbine delivers P $(V + \Delta V)$ m^3 atm of work (via connection 129) in the course of reducing the pressure of the mixed solution of zero. The net output of work is equal to the difference between the output from the hydroturbine and the input to the pump, i.e., the net work is $(P \Delta V)(m^3)$ atm.
>
> It is important to understand that net work is obtained only from ΔV the volume of permeant liquid passing through the membranes. In order to minimize the size of the membrane unit it may be stated as a first guideline:
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> Guideline 1: the ratio should be maximized of net work delivered to volume of liquid passed through the membranes.

See Loeb, col. 12, lines 15-57.

It is clear from this description that in Loeb, the diluted solute fluid is continuously flowing through the system in order to continuously turn the hydro-turbine 17. It is also clear that the additional volume added to the solute solution provided by the continuously flowing solvent solution that passes through the semipermeable barrier into the solute solution provides the additional energy needed to produce useful work.

In contrast to Loeb, the claimed invention does not rely upon additional volume of the solvent being added to the solute solution to provide the energy to operate the system. Rather, as discussed above, energy may be added to a system by increasing the pressure of the system, wherein the volume stays substantially constant. This is the method that the claimed invention relies upon.

As pointed out in paragraph 13 of the Declaration of Irving DeVoe provided herewith as Exhibit D:

> In my system, one liter of solvent solution may transfer across the semipermeable membrane leaving a one-liter space within the solvent chamber. However, unlike the prior art, my system does not add energy to the system through an increase of volume of solvent solution flowing into the solute solution. Rather my system adds energy to the system by the solvent solution flowing into the solute chamber and substantially increasing the

> pressure within the chamber. **For each stroke of the member only a small volume of solute solution, typically set approximately between 1 ml (radial 3 piston engine) and 20 ml (single piston engine), depending on the engine, is removed from the solvent chamber, but this small volume has a very high pressure, typically the pressure is approximately between 500 psi (3447 kPa) and 1900 psi (13100 kPa). Thus, for each stroke of the member, only a volume of approximately 1 mL to 7 mL of solvent must be vaporized within the recycling system.** There is no need to vaporize the entire one-liter of solvent, for example, that has flowed into the solute chamber on a single stroke of the member. Thus, the Examiner is incorrect in his assertion that my system must vaporize the entire volume of solvent that flows through the semipermeable membrane in a single stroke of the member. (Emphasis added)

As claimed in amended claims 42 and 50: the second chamber is initially closed and opened to add fluid to it then closed again and reopened to remove a portion of the dilute solution that is used to move the member in the claimed invention. In particular, the claimed invention calls for: "periodically removing and using the increased pressure to drive a member which produces a movement from which work can be extracted." It is the high pressure of the removed portion of the diluted solute solution that is used to drive the member to produce work.

In contrast to the claimed invention, Loeb uses substantially all of the fluid moving in pathway 124 across the membrane in pressure unit 124 and mixing with the pressurized concentrated solution in pathway 127 to ultimately turn hydroturbine 126. Thus, Loeb does not teach removing only a portion of the increased pressure to do work as claimed in the claimed invention. Rather, Loeb teaches to use all of the volume of fluid present in stark contrast to the claimed invention.

In addition, unlike the claimed invention, Loeb teaches a continuously operating system, that is fluid is constantly and continuously flowing through the Loeb system in order to provide continuous power to the hydroturbine so that the hydroturbine continuously operate and provide continuous energy. The claimed invention is one in which a portion of the dilute solute solution is only periodically removed from the second chamber. Thus, in the claimed invention, power is provided and the movement of the member occurs in discrete pulses, i.e., periodically, rather than continuously provided due to the constant flow of fluid through the Loeb system.

Applicant respectfully states that for the reasons stated above, independent claims 42 and 50 as amended are patentably distinct over Loeb. Claims 47-48, and claim 68 depend from claim 42 and are patentable for at least the same reasons. Claims 51-52 and 71 depend from claim 50 and are patentable for at least the same reasons. Thus, none of the claims are anticipated by Loeb for the reasons stated above and all claims are therefore patentable over the Loeb reference.

Further, based upon the above arguments the use of the Loeb reference under 35 USC § 103 would also be inappropriate. For example, the modification of the Loeb reference from a continuous system into the claimed invention, i.e., a periodic system, will render the Loeb system inoperable. This logically follows as the Loeb system is based on adding additional solvent volume via the semipermeable membrane into the solute. For a system that is not continuous and open, the additional solvent volume would not be able to move across the semipermeable membrane and into the solute solution because the fluid path would be blocked until the periodic removal of solute occurred. Only during the periodical removal of the solute would additional solvent be able to enter the system. Thus, the modification of the Loeb reference into the claimed invention will render the Loeb invention unsuitable for powering a turbine as provided for in the Loeb specification.

"If when combined, the references "would produce a seemingly inoperative device," then they teach away from their combination. *In re Sponnoble*, 56 C.C.P.A. 823, 405 F.2d 578, 587, 160 U.S.P.Q. (BNA) 237, 244 (CCPA 1969); see also *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. (BNA) 1125, 1127 (Fed. Cir. 1984) (finding no suggestion to modify a prior art device where the modification would render the device inoperable for its intended purpose)" (as cited in *Tec-Air Inc. v. Denso Manufacturing*, 192 F.3d 1353, 1360 (Fed. Cir. 1999).) In *KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740 (2007), the Court identified "teaching away" as a strong indicator of nonobviousness .

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally,

the prior art reference (or references when combined) must teach or suggest all the claim limitations." (MPEP 2143).

Since the prior art references, either separately or in combination, do not teach or suggest all the limitations of claim 1 and since the prior art references, even if modified to the claimed invention would render the prior art inoperable, the prior art teaches away from the combination, Applicants respectfully state that a prima facie case of obviousness has not established for the claimed invention.

Since the Loeb reference does not teach or suggest all the limitations of independent claims 42 and 50, Applicant respectfully states that a prima facie case of obviousness has not been established and that claims 42 and 50 are patentable over the German reference. Claims 47, 48, and 68 depend from claim 42 and are patentable for at least the same reasons as claim 42. Claims 51, 52, and 71 depend from claim 50 and are patentable for at least the same reasons as claim 50. Therefore the Applicant asserts that all claims are now in condition for allowance and requests that the Examiner pass all claims to issue.

Rejection of Claims 42, 47-48, 50-52, 68, and 71 under 35 USC §102 or in the alternative 35 USC §103(a) in view of DE 3121968

Claims 42, 47, 48, 50-52, 68, and 71 are rejected under 35 USC §102 or alternatively under 35 USC §103(a) as being anticipated or obvious over DE 3121968 ("the German reference"). The Examiner asserts that:

> DE teaches a method of pressurizing a solute solution and converting the pressure to energy (by a turbine or by a reciprocating machine, which is a piston machine: see claim 22, page 8 and 28, page 9 of the English translation of the reference: piston in the reciprocating machine has linear displacement) using a solvent by passing the solvent across into the solution through a semi permeable membrane – see figures. The solution is exhausted after the pressure is converted to energy as claimed. Solvent chamber pressure reduces due to loss of solvent by osmosis, which would inherently create a loss of pressure, or vacuum,. The solvent chamber (5) is pressurized by a pump - see figure 1, pump 22.
>
> DE teaches solvent recycle; and the process of evaporation can be optimally selected from the various available methods - see

> page 16-20 of the English translation (especially, page 18) - including air circulation, heat pump, and solar energy. Using vacuum for evaporation, particularly at ambient temperature, is known in the art. Even though the reference does not explicitly teach a third chamber, it is implied in terms of evaporation ponds or evaporators and condenser required in the various recycling schemes contemplated by the reference, which include both solvent and concentrated solute solution.

See page 10-11 of the Office Action dated July 2, 2008.

The Applicant respectfully traverses this rejection.

As pointed out above, "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP 2131. Such is clearly not the case in the present claimed invention for the German reference fails to teach all of the limitations in the Applicant's claims, the Applicant believes that claims 42, 47-48, 50-52, 68, and 71 are not anticipated by the German Reference.

It is apparent that the German reference functions in a substantially similar way to the inappropriate Loeb reference. In particular, as stated in the Abstract: "A system serving to implement this method comprises at least one reaction vessel (13)[the element number is actually 3], which is divided into two sectional chambers (5, 6) by means of a semi-permeable dividing wall (4). The fluid with the higher concentration flows through the one sectional chamber and the fluid with the lower concentration through the other sectional chamber."

Thus, the German reference, like Loeb, also uses two continuously flowing fluids that are adjacent to one another and separated by a semi-permeable membrane. As the two fluids are adjacent to the semi-permeable membrane, the solvent will flow across the membrane into the solute, wherein the solute is the used to provide energy. Accordingly, the German reference also suffers from the same deficiencies outlined above with respect to the Loeb reference and the arguments with respect to the Loeb reference are incorporated herein by reference against the German reference. As with the Loeb reference, the claimed invention calls for the periodic opening of the initially closed and sealed second chamber to "periodically removing and using the increased pressure to drive a member which produces a movement from which work can be extracted." Again, this is neither disclosed, shown, taught nor suggested in the German reference.

As pointed out in paragraph 13 of the Declaration of Irving DeVoe provided herewith as Exhibit D:

> In my system, one liter of solvent solution may transfer across the semipermeable membrane leaving a one-liter space within the solvent chamber. However, unlike the prior art, my system does not add energy to the system through an increase of volume of solvent solution flowing into the solute solution. Rather my system adds energy to the system by the solvent solution flowing into the solute chamber and substantially increasing the pressure within the chamber. **For each stroke of the member only a small volume of solute solution, typically set approximately between 1 ml (radial 3 piston engine) and 20 ml (single piston engine), depending on the engine, is removed from the solvent chamber, but this small volume has a very high pressure, typically the pressure is approximately between 500 psi (3447 kPa) and 1900 psi (13100 kPa). Thus, for each stroke of the member, only a volume of approximately 1 mL to 7 mL of solvent must be vaporized within the recycling system.** There is no need to vaporize the entire one-liter of solvent, for example, that has flowed into the solute chamber on a single stroke of the member. Thus, the Examiner is incorrect in his assertion that my system must vaporize the entire volume of solvent that flows through the semipermeable membrane in a single stroke of the member. (Emphasis added)

In addition, the German reference fails to disclose, show, teach or suggest at least four aspects of claims 42 and 50. In particular, the German reference fails to disclose, teach or suggest: 1) a closed solvent and solute chamber; 2) provide a third chamber for receiving a portion of the solute fluid; 3) applying energy to the portion of the solute solution contained in the third chamber for vaporizing the solute solution thereby separating the solute from the solvent; and 4) recycling the separated solute solution to the second chamber.

The German reference teaches only that the reaction chamber (3) [Note that the abstract has mislabeled the reaction vessel as 13] has fresh water pumped into the chamber by pump 22 via line 16 and allowed to leave by line 17, see the abstract and Fig. 1. Note that there are no valves depicted so that the flow is not interrupted and is continuous. Also note that there are no pumps in the fresh water line as well so that the fresh water is at substantially zero hydraulic pressure. In the description of the specification, the solute and solvent solutions are taught to flow past one another through the reaction chamber 3. There is no mention of sealing the solvent

side of the reaction chamber 3 or of periodically removing a portion of the increased pressure in the reaction vessel as in the claimed invention. None of the figures or descriptions teach the use of a sealed solvent chamber that is initially closed and is periodically opened to remove a portion of the diluted solute solution as in the claimed invention.

In addition, the Applicant disputes the Examiner's assertion that the DE reference suggests a third chamber as in the claimed invention, see page 11 of the current Office Action. The use of evaporation ponds does not imply a third chamber that includes an energy input source as in the claimed invention. In addition, as discussed above with respect to the Loeb reference, the Applicant has amended the claims to the previous version so that the Examiner's arguments with respect to opening and closing of the various chambers is now moot. As discussed above, the chambers are filled with solute and solvent.

Accordingly, claims 42 and 50 include elements that are not disclosed, shown, nor taught by the German reference and therefore are not anticipated by the German reference under 35 USC § 102(b). Claims 47, 48, and claim 68 depend from claim 42 and are patentable for at least the same reasons. Claims 51-52 and 71 depend from claim 50 and are patentable for at least the same reasons. Thus, none of the claims are anticipated by the German reference for the reasons stated above and all claims are therefore patentable over the German reference.

With respect to the 35 USC § 103(a) rejection, "To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." (MPEP 2143)

Because the operation of the German reference is based on the continuous flow of fresh water, at essentially zero hydraulic pressure, through side 5 of the reaction vessel 3, a closed solvent side of the reaction chamber would prevent the continuous flow of water as taught by the German reference. In addition, in the various figures in the German reference there is no storage tank or other method of regulating or storing the fresh water flowing in the system. Because there is no teaching as to storage of the fresh water in a chamber as a substitute for the continuously pumped fresh water, it is clear to one of skill in the art that continuously pumping

water into a closed chamber, as claimed in the invention would change the operation of the German reference by providing fresh water at higher than zero hydraulic pressure at the semi-permeable barrier between chambers 5 and 6 in the German reference. Because the German reference is also a pressure retarded system, as is Loeb, this increase in the fresh water pressure would reduce the retarding pressure and change the operational characteristics of the German reference, causing the device taught by the German reference to produce substantially less power and even rendering the German reference inoperable. Thus, there would be no motivation to modify the German reference to use a sealed a solvent chamber as claimed in independent claims 42 and 50, let alone add the many deficiencies of the German reference as claimed by Applicant and set forth in detail above.

Further, it would not be obvious to modify the German reference to form the claimed invention because the German reference would become inoperable. The German reference fails to discuss the use of a third chamber at al for any purpose much less recycling. In addition, the German reference fails to discuss the use of adding energy to the used solute solution to recycle the solute solution. As discussed above, the further dilution of the solute discharged via line 9 and the solvent solution discharged via line 17 a great deal more energy would need to be added to the system. Thus, to provide a recycling system to the highly diluted solute solution would cause the apparatus taught in the German reference to become inoperative for the intended purpose of the German reference. Thus, rendering the German reference inoperable and would negate any motivation to modify the German reference to include a third chamber for recycling purposes, clearly making such changes non-obvious under 35 USC § 103.

"If when combined, the references "would produce a seemingly inoperative device," then they teach away from their combination. *In re Sponnoble*, 56 C.C.P.A. 823, 405 F.2d 578, 587, 160 U.S.P.Q. (BNA) 237, 244 (CCPA 1969); see also *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. (BNA) 1125, 1127 (Fed. Cir. 1984) (finding no suggestion to modify a prior art device where the modification would render the device inoperable for its intended purpose)" (as cited in *Tec-Air Inc. v. Denso Manufacturing*, 192 F.3d 1353, 1360 (Fed. Cir. 1999).) In *KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740 (2007), the Court identified "teaching away" as a strong indicator of nonobviousness.

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." (MPEP 2143).

Since the German reference does not teach or suggest all the limitations of independent claims 42 and 50, Applicant respectfully states that a prima facie case of obviousness has not been established and that claims 42 and 50 are patentable over the German reference. Claims 47, 48, and 68 depend from claim 42 and are patentable for at least the same reasons as claim 42. Claims 51, 52, and 71 depend from claim 50 and are patentable for at least the same reasons as claim 50. Therefore the Applicant asserts that all claims are now in condition for allowance and requests that the Examiner pass all claims to issue.

Applicant's Response to the Examiner's Response to Previous Arguments

The Examiner has clearly misunderstood the Applicant's previous arguments. It is clear from a fair reading of the Applicant's previous response that the constant volume container was the pressure chamber. Only because the pressure chamber was constant volume could the pressure be increased to useable levels by the osmotic action of the solute and solvent fluids. The increase of the pressure and the use of the valves 310 and 311 in Figs. 4, 6, 7, and 9 clearly depict the removal of a small amount of high pressure solution from the constant volume pressure chamber. Only after the small portion of the fluid has been removed through the use of the above mentioned valves, is the pressure of the removed fluid used to drive a moveable member. The Applicant has discussed both previously and above the use of external energy to sustain the system and the reading and interpretation by the Examiner is considered to be not fair.

In addition, the Examiner has maintained that there is no support for the argument that claimed invention is not a continuous process as in the prior art. The Examiner again has unfairly read the claims that require "periodically opening the second chamber." A periodic process is not under any reasonable definition a continuous process. The Applicant asserts the there is no reciprocating system taught by DE. In addition, Loeb only mentions pistons once:

"However, this liquid content cannot exceed 10 or 12 percent because of excessive wear on turbine blades or engine pistons. Thus the expansion of the steam is limited." See Loeb, col. 11, lines 50-53.

Finally, the Examiner has stated that the claimed invention and system is not "logically feasible". The clear inference to be drawn from this statement is that the claimed invention and the corresponding system must violate the laws of physics, and in particular, one of the three laws of thermodynamics.

In the declaration of Prof. Grant McGimpski provided as Exhibit E, in paragraph 17 he states the reasons that: "Claim 42 includes thermodynamically allowed processes, i.e., there are no thermodynamic laws violated in this claim." In paragraph 19 he further states that: "Claim 50 therefore likewise includes only thermodynamically allowed processes, i.e., there are no thermodynamic laws violated in this claim." Thus, the claimed invention is logically feasible and does not violate the laws of physics and in particular, the laws of thermodynamics.

Conclusion

Applicants have made a diligent effort to place the claims in condition for allowance or in a better form for an appeal. In the event that the Examiner is would like to expedite the resolution of this case, it is respectfully requested that the Examiner telephone Thomas Grodt Applicant's agent at (617) 345-3253 so that any unresolved issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, all claims in this application are now considered to be in condition for allowance and such action is earnestly solicited.

The Applicant is requesting a 2 month extension and the Director of Patents and Trademarks is authorized to charge any fee needed, or to credit any overpayments, to Deposit Account No. 03-2410, Order No. 41056-101.

In accordance with Section 714.01 of the M.P.E.P., the following information is presented in the event that a call may be deemed desirable by the Examiner:

THOMAS GRODT(617) 345-3000.

Respectfully Submitted,
Irving DeVoe, Applicant

Date: November 24, 2008

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